REMARKS

In the office action, the examiner rejected claims 1-15, 16, and 25-31 under U.S.C. 102(e) as being anticipated by U.S. Patent 6,375,489 to Lu, et al. Such a rejection means that Lu must disclose every step of Applicants' method. Applicants respectfully traverse all rejections, and contend that the examiner has misunderstood the teachings of Lu, or the teachings of the present application, or both. Applicants request that the examiner reconsider and reexamine the present application in the light of the following comments.

Some background information on object-oriented programming may be helpful. Higher-level computer languages can be divided into two categories: object-oriented languages and procedural languages. C++ is an example of an object-oriented language. Fortran is a procedural language. If an object-oriented language is used, the software will be organized around classes of objects. An object contains data and can perform certain operations using those data and other information from outside the object. A "class" defines the object and the operations it can perform. The key to effective object-oriented software design is the definition of the objects and the interactions that occur between them.

The present application discloses two types of objects. One contains a particular group of grid cells, such as the grid of discrete cells that is used in a reservoir simulator software program to represent the behavior of a petroleum reservoir in simulation calculations. The other type of object contains a particular group of connections between grid cells, such as the connections by which fluids flow and energy is transported between grid cells of the reservoir. Applicants' claims are limited to these object definitions. For example, claim 1 contains the limitation, " . . . said classes of simulation objects comprising cell-group objects and connection-group objects." Since definition of the objects and their interactions is the crux of any object-oriented programming effort, Lu cannot anticipate Applicants' claims unless Lu discloses Applicants' cell-group objects and connection-group objects. Of all the parts in Lu cited by the examiner, only column 10, lines 50-65 discuss definition of object classes. (Lu is indifferent to whether his method is programmed in object-oriented language or in a procedural language; see column 27, lines 17-19.) In that passage, Lu discloses an Aggregate Object class which he uses to associate

a geometrical feature (his Geometry Object class) with its graphics (as in a computer monitor display) representation (his Graphics Object class). Clearly, the Lu patent is but one of many publications that can be found that disclose object definitions for object-oriented programming that neither teach nor suggest Applicants' objects or the possibilities that Applicants disclose for exploiting such definitions for purposes such as reservoir simulation.

Contributing to the confusion may be the fact that Lu uses *objects* in two ways. His second usage is to refer to three dimensional sub-regions of a data volume, i.e., a geometric feature. Thus he divides the volume into discrete cells, but says nothing about defining the cells to be "objects" in the sense of object-based programming. Instead, his purpose is to deduce which cells are sufficiently connected to be called objects, or bodies. The relevant portions of the Lu patent include column 7, lines 24-40 and 53-63. This pertains to the science of body identification and has nothing to do with object-oriented programming. Similarly, Lu uses cells, but not in the sense of defining them to be objects for object-oriented programming. The examiner also misconstrues column 8, lines 17-26. Lu is discussing geometric objects comprising a plurality of cells, not cells as objects in an object-oriented program.

It is even clearer that Lu does not disclose Applicants' connection-group objects. The section of Lu that the examiner contends discloses this feature is column 10, line 50, to column 11, line 4. This is the passage, discussed above, where Lu defines some totally different objects. There is no suggestion of Applicants' connection-group objects in this passage or elsewhere. The examiner may be confusing references to cells being connected for purposes of object identification (referring to actual 3-D bodies). This has nothing to do with connections between cells in Applicants' sense of describing fluid flow and energy transport between cells. Moreover, there is no passage in Lu that can be construed to suggest that such connections, or even connections of any sort, are defined as objects for use in a particular exercise in object-oriented programming.

For the reasons explained above, Lu does not anticipate Applicants' claim 1, and therefore does not anticipate any claim depending on claim 1.

Lu does not anticipate Applicants' independent claim 16 for the same reasons stated above and further because nothing can be found in Lu to teach or suggest Applicants' step "generating a plurality of connections representative of a cell-to-cell transport phenomenon." (Emphasis added.) Similarly, Lu does not anticipate Applicants' claims 25-31 for the same reasons discussed above in connection with claim 1.

CONCLUSION

Each of the claims of the application is limited to Applicants' method of using cell-group objects and connection-group objects in an object-oriented program to predict a fluid property or simulate fluid flow in a physical system such as a hydrocarbon-bearing reservoir. Each of Applicants' claims is believed to be patentably distinct from all known prior art, including all art cited by the examiner. Therefore, Applicants respectfully request allowance of all pending claims, as amended herein. If the examiner wishes to discuss this application with counsel, please contact the undersigned.

Respectfully submitted,

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I hereby certify that this correspondence is being transmitted via facsimile to Examiner Thai Q. Phan, United States Patent and Trademark Office at (703) 872-9306 on July 19, 2004.

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